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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/657,094

09/09/2003

Takao Kamoshima

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9847

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09/09/2004

McDermott, Will & Emery
600 13 th Steet, N.W.
Washington, DC 20005-3096

EXAMINER

NGUYEN, DILINH P

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 09/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/657,094

Applicant(s)

KAMOSHIMA ET AL.

Examiner

DiLinh Nguyen

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 June 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 2-4 is/are allowed.
- 6) ☒ Claim(s) 1 and 5-9 is/are rejected.
- 7) ☒ Claim(s) 10 and 11 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 5-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Moslehi (U.S. Pat. 6124198).

- Regarding claims 5-7, Moslehi discloses a semiconductor device (fig. 3) comprising:

a first conductive layer (N-1) formed on a substrate and composed of a copper layer (column 2, lines 25-30);

an insulating layer formed on the first conductive layer and having a first hole and a second hole reached the first conductive layer; and

a second conductive layer 34 for electrical connection to another element, electrically connected to the first conductive layer through the first hole and formed within the insulating layer;

the second hole electrically connect the first conductive layer; wherein

Moslehi discloses a plurality of metallic columns made of stacked dummy contact and via plugs may be used to provide additional mechanical support (column 14, lines 8-12).

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- Regarding claim 8, Moslehi discloses the first conductive layer (N-1) has a first interconnection portion with a large line width (N-1 on the right hand side) and the second conductive layer has a second interconnection portion with a small line width, and the first interconnection portion with the larger line width is connected to the second interconnection portion with the small line width through the hole.
- Regarding claim 9, Moslehi discloses a semiconductor device (fig. 3) comprising: the first conductive layer (N-1) has a first interconnection portion with a large line width (right hand side), and a second interconnection portion with a small line width (left hand side), a second conductive layer has a third interconnection portion with a small line width, and the second interconnection portion with the small line width is connected to the third interconnection portion with the small line width through the hole.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (U.S. Pat. 6040243) in view of Kasai (U.S. Pub. 2002/0084526).

Li et al. disclose a semiconductor device (cover fig.) comprising:

a first conductive layer 68 formed on a substrate 60 and composed of a copper layer;

an insulating layer 76 formed on the first conductive layer and having a hole reached the first conductive layer;

a second conductive layer 100 formed within the insulating layer and composed of a copper layer electrically connected to the first conductive layer through the hole; and

a barrier metal layer 92 formed between the second conductive layer and the hole, and the insulating layer; wherein

the barrier metal layer has an opening in a bottom portion of the hole, and the second conductive layer comes in direct contact with the first conductive layer through the opening.

Li et al. fail to disclose the single barrier metal layer formed on an entire surface defining the hole and the groove in the insulating layer.

Kasai discloses a semiconductor device comprising a single barrier layer formed on an entire surface defining a hole 40 and a groove 11d in an insulating layer (figs. 9-11, paragraph 0046). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device structure of Li et al. by having the single barrier layer formed on an entire surface defining a hole and a groove with the structure as set forth above because as taught by Kasai, such single barrier layer would provide a method of manufacturing the device with a reduced number of steps (figs. 9-11, paragraph 0050, lines 4-5).

Allowable Subject Matter

Claims 10-11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims Allowed

Claims 2-4 are allowed.

Response to Arguments

Applicant's arguments filed 6/10/04 have been fully considered but they are not persuasive.

The applicant argues that Moslehi fails to disclose the second hole is used as a dummy hole which does not electrically connect the first conductive layer to another element.

The Examiner respectfully disagrees.

Moslehi discloses a semiconductor device (fig. 3) comprising:

a first conductive layer (N-1) formed on a substrate and composed of a copper layer (column 2, lines 25-30);

an insulating layer formed on the first conductive layer and having a first hole and a second hole reached the first conductive layer; and

a second conductive layer 34 for electrical connection to another element, electrically connected to the first conductive layer through the first hole and formed within the insulating layer;

the second hole electrically connect the first conductive layer; wherein

Moslehi discloses a plurality of metallic columns made of stacked dummy contact and via plugs may be used to provide additional mechanical support (column 14, lines 8-12).

Moslehi discloses the second hole (the via plug on the right hand side) is used as a dummy hole which does not electrically connect the first conductive layer to another element (column 14, lines 8-12). The via plug is directly contact with the lower conductive layer (N-1) (fig. 3).

Moreover, the it would have been obvious to one having ordinary skill in the art to form the hole is used as a dummy hole for mechanical support structure which does not electrically connected to the conductive layer to another element.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DiLinh Nguyen whose telephone number is (571) 272-1712. The examiner can normally be reached on 8:00AM - 6:00PM (M-F).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DLN



LONG PHAM
PRIMARY EXAMINER